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IS : 1528 (Part X) - 1974

( Reaffirmed 1997 )

*Indian Standard*

METHODS OF SAMPLING AND PHYSICAL  
TESTS FOR REFRACTORY MATERIALS

PART X DETERMINATION OF SIZE OF REFRACTORY BRICKS

*( First Revision )*

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# *Indian Standard*

## METHODS OF SAMPLING AND PHYSICAL TESTS FOR REFRACTORY MATERIALS

### PART X DETERMINATION OF SIZE OF REFRACTORY BRICKS (First Revision)

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*Indian Standard***METHODS OF SAMPLING AND PHYSICAL  
TESTS FOR REFRACTORY MATERIALS****PART X DETERMINATION OF SIZE OF REFRACTORY BRICKS  
( First Revision )****0. FOREWORD**

**0.1** This Indian Standard (Part X) (First Revision) was adopted by the Indian Standards Institution on 10 July 1974, after the draft finalized by the Refractories Sectional Committee had been approved by the Structural and Metals Division Council.

**0.2** Methods of sampling and physical tests for refractory materials were originally covered in IS: 485-1953 'Methods of sampling and testing of refractory materials (*tentative*)'. This Indian Standard was first published in 1962 on methods of sampling and physical testing of refractory materials. As a result of experience gained during these years, certain modifications have been made in the methods of sampling, methods of physical tests and the method for the determination of the warpage in refractory materials. The Sectional Committee while issuing this revision felt it desirable to issue the standard in separate parts.

Other parts of this standard, published so far, cover the following :

|           |                                                                             |
|-----------|-----------------------------------------------------------------------------|
| Part I    | Determination of pyrometric cone equivalent (PCE) or softening point        |
| Part II   | Determination of refractoriness under load                                  |
| Part III  | Determination of spalling resistance                                        |
| Part IV   | Determination of cold crushing strength                                     |
| Part V    | Determination of modulus of rupture                                         |
| Part VI   | Determination of permanent change after reheating                           |
| Part VII  | Methods of sampling and criteria for conformity                             |
| Part VIII | Determination of apparent porosity                                          |
| Part IX   | Determination of true specific gravity and true density                     |
| Part XI   | Determination of warpage                                                    |
| Part XII  | Determination of bulk density                                               |
| Part XIII | Determination of resistance to the disintegrating effect of carbon monoxide |
| Part XIV  | Determination of sieve analysis                                             |

**0.3** In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960\*.

## 1. SCOPE

**1.1** This standard (Part X) prescribes the method of test for determination of size of refractory bricks.

## 2. TERMINOLOGY

**2.1** For the purpose of this standard, the definitions given in IS : 4041-1967† shall apply.

## 3. DETERMINATION OF SIZE OF REFRACTORY BRICKS

**3.0 Object of Test** — This test covers the procedure for measuring the size of rectangular refractory bricks or shapes.

**3.1 Apparatus** — The apparatus shall consist of the following.

**3.1.1 30-cm Hook-Rule** — a steel rule 30 cm in length, graduated on both the edges in 0.5 mm. The rule shall have a hook consisting of a right-angled piece on one end to fix the zero point of the scale against one face of the brick. The hook shall be 5 mm in width and shall extend beyond the measuring side of the rule as shown in Fig. 1.

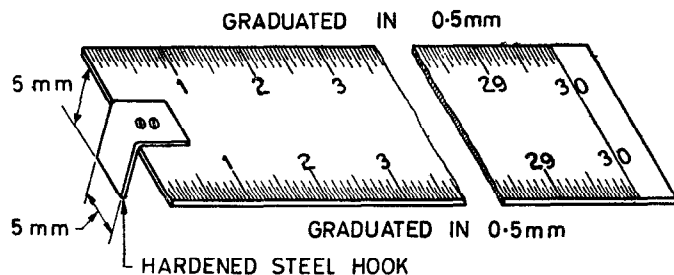


FIG. 1 DESIGN OF 30-CM HOOK-RULE

**3.1.2 100-cm Hook-Rule** — a stiff steel hook-rule 100 cm in length, graduated in 0.5 mm for use in stack measurements and for measuring the larger shapes by use of the hook. The metre rule shall have the same design and the graduations on the top as specified for the 30-cm rule.

NOTE — The hook-rules shall be checked periodically to determine whether or not they have become distorted or worn in use.

\*Rules for rounding off numerical values (*revised*).

†Glossary of terms relating to refractory materials.

**3.2 Preparation of Specimens** — Remove any pimples or fins from the specimens by lightly rubbing them together.

### 3.3 Measurements

**3.3.1 Length and Width** — Measure the length and width of the specimens across the middle of each of the faces of largest area to the nearest 0.5 mm when the dimensions are 230 mm and under, and to the nearest 1 mm when the dimensions are over 230 mm. The position of the hook-rule for these measurements is indicated by lines *L* and *W* in Fig. 2. Make the individual measurements of the two opposite faces of each specimen and record them.

**3.3.2 Thickness** — Stack the specimens first on a plane surface without regard to the position of the brand marks on the specimens. Then measure the stack to the nearest 1 mm from the plane surface to the top of the stack at the centre of each side. Record the individual measurements of the four sides of the stack. In the case of bricks or shapes over 75 mm in thickness, measure the thickness by the procedure described under 3.3.1. The position of the hook-rule for the thickness measurements is indicated by the line *T* in Fig. 2.

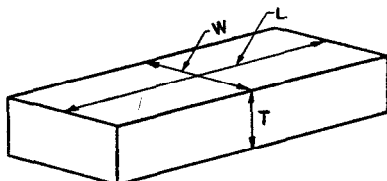


FIG. 2 MEASUREMENTS OF REFRACTORY BRICK

**3.4 Report** — Report the average of the two individual measurements for length and for width of each specimen. Report the thickness as the average stack height divided by the number of specimens, except for these thickness measurements on bricks over 75 mm in thickness obtained by the use of a hook-rule in which case report them as the average thickness of individual specimens.

## 4. SAMPLING AND CRITERIA

**4.1** The procedure for sampling and the criteria for conformity shall be as laid down in IS : 1528 (Part VII)-1974\*.

\*Methods of sampling and physical tests for refractory materials : Part VII Methods of sampling and criteria for conformity (*first revision*).

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ON

## REFRACTORIES

IS:

- 6-1967 Moderate heat duty fireclay refractories, Group A (*third revision*)
- 7-1967 Moderate heat duty fireclay refractories, Group B (*third revision*)
- 8-1967 High heat duty fireclay refractories (*third revision*)
- 195-1963 Fireclay mortar for laying fireclay refractory bricks (*second revision*)
- 483-1972 Fireclay refractories for oil-fired boiler furnaces of naval ships (*first revision*)
- 484-1958 Silica refractories for general purposes (*revised*)
- 1292-1958 Mortar for laying silica bricks
- 1335-1959 Methods for the direct determination of alumina in refractory materials (*tentative*)
- 1522-1967 Fireclay glass tank blocks (*first revision*)
- 1523-1972 Bottom-pouring refractories for steel plants (*first revision*)
- 1524-1968 Refractory sleeves (*first revision*)
- 1525-1968 Ladle refractories for steel plants (*first revision*)
- 1526-1960 Sizes and shapes for firebricks (230 mm series)
- 1527-1972 Methods for chemical analysis of high silica refractory materials (*first revision*)
- 1529-1971 Blast furnace refractories for steel plants (*first revision*)
- 1748-1961 Sizes of graphite crucibles
- 1749-1972 Magnesite refractories (*first revision*)
- 1750-1961 Dead-burned pea magnesite
- 1751-1968 Fireclay cupola refractories (*first revision*)
- 2042-1972 Insulating bricks (*first revision*)
- 2043-1963 Siliceous fireclay refractories
- 2044-1962 Sillimanite refractories for glass melting tank furnaces
- 2045-1962 Natural sillimanite blocks for glass melting tank furnaces
- 3304-1965 Burnt magnesite-chrome refractories for general purposes
- 3305-1965 Burnt chrome-magnesite refractories for general purposes
- 4041-1967 Glossary of terms relating to refractory materials
- 4564-1968 Fireclay nozzles
- 4565-1968 Fireclay stoppers
- 4801-1968 Chemically-bonded magnesite-chrome refractories for roof lining
- 4812-1972 Silica refractories for coke oven (*first revision*)
- 4813-1968 Chemically-bonded chrome-magnesite refractories for general purposes
- 4814-1968 Chemically-bonded magnesite-chrome refractories for general purposes
- 5495-1969 Sizes and shapes for firebricks (300 mm and higher series)
- 6727-1972 Fireclay checker-bricks for open-hearth furnace
- 6728-1972 Recuperator tubes, tiles and collars for soaking pits in steel plants

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